REMARKS

This Reply is responsive to the Office Action mailed July 27, 2006. Reconsideration of the rejections set forth therein is respectfully requested in view of the amendments made to the claims and the following remarks.

Amendments to the Specification

Paragraphs [01] through [04] have been amended to provide updated information about the related and co-owned applications cited in those paragraphs, in particular the published patent application document numbers and issued patent numbers. Paragraph [033] has been amended to correct the references to the equations; these equations are discussed in the paragraphs immediately preceding paragraph [033].

Applicants believe that none of these amendments adds new matter to the application.

Amendments to the Claims

Prior to entry of this amendment, Claims 1 – 29 were pending in the present application. Claims 22 – 29 have been withdrawn in response to a restriction requirement and are canceled in this amendment.

Claims 1 and 11 have been amended with respect to the limitation of dividing the target color space into regions, in order to conform these claims to the specification at paragraphs [036] and [037], where the interior color point is not referred to as a "primary." Claim 1 has also been amended to correct grammatical informalities, and also to remove a calculating step that is originally represented in dependent claim 9. Claims 6, 9 and 10 have been amended to correct grammatical informalities and provide proper antecedent basis. Claims 15, 16, 19 and 20 have been similarly amended. Claim 21 has also been amended.

New claims 30 – 33 have been added including independent claim 32.

Applicant believes that none of these amendments to the claims adds new matter to the application.

Response to Restriction Requirement

The Office Action identifies two groups of inventions as being distinct from one another:

> Group I including claims 1 – 21 drawn to a method and system for converting a source color space of N primary color points to a target color space of N+1 or more color points, dividing the target color space into a set of regions, which is classified in class 345, subclass 591, and
>
> Group II including claims 22 – 29, drawn to a method and system for calculating multiprimary conversion matrices by compressing these matrices into smaller dimensioned matrices, performing matrix multiplies with these smaller matrices, and multiplexing the results to create multiprimary values, classified in class 345, subclass 644.

A telephone election was made on June 29, 2006 electing claims 1 – 21 in Group I, and the Office Action requires written affirmation of the election.

Applicant affirms that claims 1 – 21 in Group I identified above are elected for prosecution in this application. Claims 22 – 29 currently pending in this application have the status of "withdrawn" from further consideration by the Examiner.

Claim Rejections under 35 USC 102

The Office Action rejects Claims 1 – 9 and 11 - 19 under 35 U.S.C. 102 as being anticipated by Childs et al. (GB 2,282,928 A), hereinafter referred to as Childs. The undersigned notes that the Office Action cited the reference as GB 2,282,929, but the document that was provided with the Office Action is identified as GB 2,282,928. The Office Action discusses claim 1 at paragraph 7 (at pages 3 – 5), and discusses claim 11 at paragraph 16 (at pages 6 and 7). In the discussion of claim 11,

the Office Action refers to the discussion of claim 1, and so in the remarks that follow, arguments presented with respect to claim 1 will apply equally to claim 11.

Claims 1 and 11

Claim 1 is directed to a method for converting from a source color space to a target color space, said source color space defined by a combination of N primary color points, wherein N is an integer. The method comprises for the target color space, defining a set of at least N+1 primaries in which color points will be rendered as a combination of said primaries, said at least N+1 primaries forming the boundary of the target color space. The method further comprises defining an interior color point positioned in the interior of the boundary of said target color space, dividing said target color space into a set of regions that are bounded by at least two of the at least N+1 primaries and by said interior color point, calculating solution matrices for each said region, and for any given color point in said source color space, selecting one of said solution matrices for rendering said source color point with said target primaries.

Claim 11 is directed to an image processing system for converting from a source color space to a target color space, said source color space resulting from a combination of N primary color points, wherein N is an integer. The image processing system comprises a display for displaying image data in at least one of the source color space and target color space, and processing circuitry configured to define a set of at least N+1 primaries in which color points will be rendered as a combination of said primaries for the target color space, said at least N+1 primaries forming the boundary of the target color space. The processing circuitry is further configured to define an interior color point positioned in the interior of the boundary of said target color space, and to divide said target color space into a set of regions that are bounded by at least two of the at least N+1 primaries and by said interior color point. The processing circuitry is further configured to calculate solution matrices for each region, and to select one of said solution matrices for rendering a source color point with said target primaries for any given color point in said source color space.

The teachings of Childs

Applicant respectfully traverses the Section 102 rejection as to the interpretation in the Office Action of the limitations of defining an interior color point positioned in the interior of said target color space and dividing said target color space into a set of regions that are bounded by at least two of the at least N+1 primaries and by said interior color point, and in view of the amendments made to these limitations herein. As noted above, Claims 1 and 11 have been amended with respect to the limitation of dividing the target color space into regions, in order to conform these claims to the specification at paragraphs [036] and [037], where the interior color point is not referred to as a "primary."

Childs discloses a video display apparatus that receives a transmitted color video signal coded using three system primaries Rs, Gs, Bs and decodes the signal for display on a device using four display primaries. The four display primaries are independent, in that no display primary can be expressed as a combination of another two display primaries, and so define a quadrilateral in a chromaticity diagram. (Childs, Abstract.)

The Office Action, in paragraph 7, states that Childs teaches defining a set of at least N+1 primaries in which color points will be rendered as a combination of said primaries, with reference to FIG. 5, and the four display primaries R_d, G_{1d}, G_{2d} and B_d corresponding to the N+1 primaries of the target color space.

Applicant agrees that the color space formed by the four display primaries R_d, G_{1d}, G_{2d} and B_d in FIG. 5 meets the limitation of claim 1 of, for the target color space, defining a set of at least N+1 primaries in which color points will be rendered as a combination of said primaries, said at least N+1 primaries forming the boundary of the target color space. FIG. 5, which is reproduced herein below, shows the "quadrilateral in a chromaticity diagram" as noted in the Abstract quoted above, formed by the four display primaries R_d, G_{1d}, G_{2d} and B_d in the solid lines within the spectrum locus of the chromaticity diagram.

The Office Action then states that Child teaches defining a color point in the interior of said color space (FIG. 5; R_d, G_{1d}, G_{2d}, B_d D65 corresponds to color point defined in the interior of said target color space.) The Office Action then states that Child teaches dividing said target color space into a set of regions that are bounded by at least three primaries, said one of at least three primaries comprising said interior color point, with reference to FIG. 5, pg 8 paragraph 4. The Office Action goes on to state that dissecting the color gamut of the display corresponds to dividing said target color space; triangles correspond to regions; formed by sets of three of the display primaries corresponds to bounded by at least three primaries. The Office Action further states that FIG. 5 shows that the triangles formed includes the interior color points R_d, G_{1d}, G_{2d} and B_d.

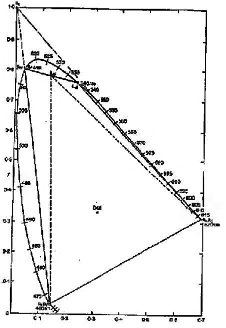

FIGURE 5

To be clear as to which regions Childs refers to, in FIG. 5, each of the regions (called "triads" in Childs) bounded by one or two of the dashed lines are defined by two of the primaries and a so-called "fifth imaginary primary." Childs discloses that

> a fifth, imaginary display primary is determined as a linear combination of the third and fourth display primaries and the quadrilateral divided into triads defined respectively by the first, fourth and fifth, first, fifth and second, and second, fifth and third display primaries. The received video signal is decoded by three matrix arithmetic units 12, 14, 16, one for each triad, and drive signals for the first to fourth display primaries calculated. For each pixel, an arithmetic unit output producing no negative display drive signals is then selected and its output switched by switches 20, 22, 24 to drive a four-primary display device 2.

(Childs, Abstract.) See also the discussion in Childs started at page 17 in the section labeled "7. Analysis using a Fifth Display Colour." The fifth imaginary primary is defined to be

> formed from an approximately equal mixture of G_{1d} and G_{2d}. Inside the triangle formed by R_d, G_{3d} and B_d, colours are matched by the appropriate mixture of these three primaries. Outside this triangle, colours are matched by a mixture of R_d, G_{1d} and G_{3d} or G_{2d}, G_{3d} or B_d, whichever is more appropriate.

Childs, at page 17.

Applicant respectfully disagrees with the interpretation in the Office Action of Applicant's claim 11 as taught by Childs. Since the Office Action has already stated that the four display primaries R_d, G_{1d}, G_{2d}, B_d form the target color space, Applicant respectfully submits that these display primaries <u>cannot also be interpreted as an color point positioned in the interior of the boundary of the target color space they define</u>. Applicant's claims 1 and 11 include the limitation that said at least N+1 primaries form the boundary of the target color space, and Claim 1 includes the steps of defining an <u>interior color point positioned in the interior of the boundary of said</u>

target color space, dividing said target color space into a set of regions that are bounded by at least two of the at least N+1 primaries and by said interior color point.

Thus, none of these regions in Childs is formed by at least two of the at least N+1 primaries and by an interior color point. The Office Action points to the indication of D65 in FIG. 5, which is an interior color point, but the regions formed by Childs are not bounded by at least two of the at least N+1 primaries and by interior color point D65. The regions in Childs in both FIGS. 5 and 3 are all defined by primary colors, and not by any color point in the interior of the boundary of the target color space. FIGS. 5 and 3 include a system primary at the very top of the figure labeled G_s and imaginary primary G_{3d} is interior to the system (or source) color space formed by the points R_s, G_s and B_s. But this system primary is not part of the target color space defined by the four display primaries R_d, G_{1d}, G_{2d} and B_d. Applicant respectfully submits the four display primaries cannot be interior to the boundary of the target color space they define.

Regarding claims 3 and 13, the Office Action states that the interior color point D65 is the white point of the target color space. Applicant respectfully submits that this may be correct, but each of these claims includes all of the limitations of the claim from which it depends, and it has been shown above that the regions formed by Childs are not bounded by at least two of the at least N+1 primaries and by interior color point D65, as required in claims 1 and 11.

Regarding claims 4 and 14, the Office Action states that G_{3d}, the so-called fifth imaginary primary, is an interior point of the target color space and is an off-white color point. Since G_{3d} is "formed from an approximately equal mixture of G_{1d} and G_{2d}", it is a green color and so could be interpreted to be "off-white." However, Applicant respectfully submits that each of these claims includes all of the limitations of the claim from which it depends, and it has been shown above that the primary colors that define the boundary of the target color space cannot also be interpreted to be an interior color point of the same target color space.

For the foregoing reasons, Applicant respectfully submits that claims 1 and 11 is not anticipated by the Childs reference, and so is in condition for allowance. As to claims 2 – 10 and 12 - 20, since these claims depend from now-allowable claims 1 and 11, these claims are also allowable and should be passed to issue with Claims 1 and 11.

Claim Rejections under 35 USC 103

The Office Action rejects Claims 10 and 20 under 35 U.S.C. 103(a) as being unpatentable over Childs et al. (GB 2,282,928 A) and further in view of Ito (US 4,989,079), hereinafter "Ito."

Claims 10 and 20

Claim 10 depends from Claim 9, which recites wherein the step of selecting one of said solution matrices for rendering said source color point with said target primaries comprises determining in which region said source color point resides. Claim 10 as amended further limits the step of determining which region said source color point resides as comprising determining the hue angle of said source color point, and using said hue angle to select the region in which said source color point resides. Claims 9 and 10 include all of the limitations of claim 1, which includes the steps of calculating solution matrices for each said region, and for any given color point in said source color space, selecting one of said solution matrices for rendering said source color point with said target primaries. Thus, claims 9 and 10 further limit the selecting step of Claim 1 for selecting a solution matrix.

Claim 20 depends from claim 19, which recites the image processing system of Claim 11 wherein the processing circuitry is further configured to determine in which region said source color point resides. Claim 20 further limits the processing circuitry to be further configured to determine the hue angle of said source color point and to determine from said hue angle in which region said source color point resides.

The Office Action finds that Childs teaches all of the claimed limitations of the base claims as presented earlier, but that Childs does not explicitly teach determining

the hue angle of the source color point, and determining from the hue angle in which region the source color point resides. But the Office Action finds that Ito teaches calculating the hue, interpreted to be the hue angle, of a signal, interpreted to be a color point, on the basis of the density ratio of three primaries, and based on the hue of the input signal, interpreted to be a color point, it is determined which of six hue areas, interpreted to be regions, it belongs, citing to FIG. 12, col. 16 lines 35 – 76, and col. 17, lines 1 – 42 in Ito for these teachings.

The Office Action then states that it would have been obvious to one of ordinary skill in the art at the time the invention was made to calculate hue of a color point to determine it's region of location as taught by Ito and apply it into the method of Childs because calculating the hue on the basis of the ratio of spectral densities improves color harmony at the boundary between hue areas.

Applicant respectfully submits that the stated motivation as taken from the Ito reference is specific to the particular application taught in Ito, namely that of converting an input RGB signal to printing ink densities in an output CMY-based printing device, and that such a motivation is not applicable to the display signal conversion problem addressed in the Childs' disclosure, or the color space conversion issue addressed in Applicant's claims 1 and 11. Therefore, a person of ordinary skill in the art would not seek to use hue angle to determine the region in which the source color point resides in Childs, or in Applicant's claims 1 and 11, on the basis of the teachings of Ito with respect to how the use of hue improves color harmony at the boundary between hue areas in a CMY printing color space.

Quoted passages from the Ito disclosure help to explain the problem Ito addresses. Ito teaches

> [a] color correction device used for a color electrophotographic machine or color printing machine. The device includes a hue area judgment unit for judging to which hue area among at least three predetermined hue areas the hue represented by input color image signals belongs. With respect to the judged hue area according to this judgment, color

> correction parameters are set, and in accordance with the set color correction parameters, the input image signals are converted to output color image signals used for printing.

Ito, Abstract. As a threshold teaching, then, Ito is concerned with converting input image signals to output color image signals used for printing, and in fact converts from an input three-color source color space of RGB to an output three-color target color space of CMY (or CMYK, where K is considered to be black.) See, e.g., col. 1, lines 14 – 50. See also col. 9, lines 59 – 68, where Ito states

> [t]he color correction circuit 105 performs a masking operation. Namely, it converts input R, G and B signals Dr, Dg and Db to signals Dc, Dm, Dy and Dbk corresponding to C (cyan), M (magenta), Y (yellow) and BK (black) printing colors and the respective toner densities. In this conversion, basic color correction may be performed to correct a deviation from the ideal printing characteristic of the device itself and additional color correction may be carried out in accordance with the instruction from the console board 300.

Thus, Ito does not convert source image signals from an N-primary source color space to an N+1-primary target color space. Ito is concerned with identifying the hue of the input image signal because of the particular application of converting from the additive color system of the RGB input image signal used for displaying an image to the subtractive color system of the CMY printing color space. Ito explains the problem as follows:

> Theoretically, the original image and print image are the same in color. However, actually, if the R, G and B signals obtained from the original are solely converted to C, M and Y signals and are printed in three color toners, a large difference will be produced between the original color and the printed color because (a) the spectral characteristic of color separation filters used in the image read unit are actually not ideal, (b) the color of each of the toners used for printing is also not ideal, and (c)

> the color obtained by the principle of subtractive color mixture for laying a plurality of print colors sequentially one on top of another is different from the actual printed color. In order to avoid such discrepancy, when the R, G and B signals are converted to the C, M and Y signals, a masking process is performed to correct the colors. Furthermore, in order to reproduce a correct achromatic color, often achromatic color components (black and gray) are extracted from the R, G and B signals and are printed by a separate black toner. However, an "additivity rule of densities" does not actually hold due to the influence of surface reflection, etc. As a result, correct color correction cannot be performed.

Ito, at col. 1, lines 27 – 50. In the Summary section, Ito explains how the hue is used to perform better color correction than a conventional masking technique:

> When color conversion is performed in accordance with a normal masking equation, color correction is performed for various hues even if part of the masking coefficients may be changed. Therefore, it is very difficult to limit a hue to be actually adjusted to only a color to be changed. In the color correction device according to the present invention, a hue is divided into a plurality of hue areas in each of which color is then corrected using the corresponding separate color correction parameters. A change of color correction parameters in the masking circuit causes the color characteristic, for example a hue, to change. According to the above arrangement, the color correction parameters are independent for each hue area, so that color correction is not performed on image portions having a hue greatly remote from a hue whose color is to be adjusted. Thus the color adjustment that the operator does not intend to perform is not carried out.

Ito, at col. 2, line 50 to col. 3, line 8. Ito goes on to provide an example in this same passage:

> If for example, a hue is to be divided into six areas R-Y, Y-G, G-C, C-B, B-M and M-R with six hues of R, G, B, C, M and Y as the boundaries, separate masking coefficients are set in the six corresponding hue areas, so that when, for example, the hue of the R color is to be adjusted, the masking coefficients in the R-Y and M-R areas related to the R color are changed and the masking coefficients in the other remaining hue areas are not changed. Therefore, color adjustment is not performed for the hues excluding that to be adjusted.
>
> Generally, the influence of the respective C, M and Y toners on the spectral density of a printed color changes depending on how the C, M and Y toners overlap, i.e., the printed color, especially, its hue. Therefore, the "additivity rule of densities" does not hold, so that it is impossible to make coincide a theoretical color corresponding to the ratio of amounts of the respective toners used in printing and the corresponding actual printed color.
>
> However, according to the above structure, different color correction parameters can be set in the corresponding hue areas, so that optimal masking coefficients corresponding to how C, M and Y overlap may be set in the corresponding hue areas of a printed color. Thus by color correction using the masking coefficients, the influence of the fact that the "additivity rule of densities" does not hold is reduced to thereby provide color correction with high accuracy.

Ito, at col. 3, lines 9 – 37. These 6 areas can be seen in FIG. 12, reproduced here:

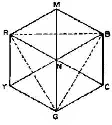

Fig. 12

Applicant respectfully submits that Ito identifies the hue of the input color signal in order to ultimately determine color correction parameters for printing ink densities.

> The influence of C, M, Y and BK on the spectral density of a printed color varies depending on how C, M, Y and BK overlap, namely, the printed color. According to the above structure, different extraction parameters can be set in the corresponding areas divided by hues, so that optimal extraction parameters corresponding to the state in which the toners overlap can be set for the corresponding printed color. Thus errors involved in achromatic color component extraction are reduced.
>
> Preferably, the color correction device further comprises a second parameter setting unit for setting the color correction parameters in the color conversion unit on the basis of the hue area judged by the hue area judgement unit.
>
> It is desired that the second parameter setting unit comprises a parameter hold circuit for holding color correction parameters the number of which is equal to or greater than the number of the predetermined hue areas, and a selection circuit for selecting a part of the color correction parameters held in the parameter hold circuit in accordance with the hue area judged by the hue area judgement unit.

Ito, at col. 4, lines 27 – 49. Applicant respectfully submits that Ito calculates the hue on the basis of the ratio of spectral densities because the disclosed technique is being applied to producing color correction parameters that are applied to printing inks or toners, and so results in improved color harmony at the boundary between hue areas when the corrected colors are printed.

However, in the case of the Childs disclosure, one needs only to convert a source color point into its chromaticity coordinates in the CIE color space or to its CIE XYZ tristimulus values (which is implicitly accomplished by each conversion matrix) to determine in which one of the three triads/regions of the target color space formed

by the four display primaries R_d, G_{1d}, G_{2d} and B_d in FIG. 5 a source color resides. Knowing in which region the source color point resides in turn determines which of the conversion matrices is used to perform the color conversion. See Childs at pages 12 and 15 – 22, and the hardware implementation shown in FIG. 4. A hue angle is simply not needed to determine the appropriate conversion matrix.

Moreover, it can be seen that the regions or triads of Childs shown in FIG. 5 are not regions that are determined according to hue. Each region, in fact, appears to have colors of many hues, especially the largest triad region formed by display primaries R_d, G_{3d} and B_d. Thus, using hue to determine in which of the three regions of the target color space formed by the four display primaries in FIG. 5 a source color resides would not produce a unique result. Thus, Applicant respectfully submits that a person of ordinary skill would not use hue because it would not uniquely select the appropriate conversion matrix to use to convert the input color to the output color.

Therefore, Applicant respectfully submits that making the combination of teachings in the Childs and Ito references would not in fact produce the method and display of Applicant's claims 1 and 11, and that further the motivation stated in the Office Action for making the asserted combination of references is flawed in view of the different color conversion technologies (display-to-display in Childs and display-to-printer in Ito) and their respective problems that these references address.

For the foregoing reasons, Applicant respectfully submits that amended claims 10 and 20 are patentable over the asserted combination of Childs and Ito, and are in condition for allowance.

Claim 21

The Office Action rejects Claim 21 under 35 USC 103(a) as being unpatentable over the combination of Childs and further in view of Kasson (US 5,450.216.)

Claim 21 as amended is directed to a system for converting from a source color space to a target color space, wherein said source color space comprises N

primary color points and said target color space comprises at least N+1 primary color points. The system comprises input means for accepting source image data color points, a hue angle calculator configured for calculating hue angles for the source image data color points, a gamut converter configured for optionally fitting the gamut of the source color space to the gamut of said target color space using the calculated hue angles, and a multi-primary converter configured for converting said source image data color points from the N-primary source color space into image data values for the at least N+1 primary target color space using one of a plurality of conversion matrices; wherein the multi-primary converter is further configured to select said conversion matrix using the calculated hue angles.

The Office Action finds that Childs discloses the multi-primary converter of Claim 21. The Office Action also finds, however, that Childs does not explicitly teach the hue angle converter or the gamut converter.

The Office Action further finds that Kasson teaches to compute the hue angle as the arctangent of the ratio of the two chrominance components, interpreting this as teaching a hue angle calculator, and citing FIG. 5 and col 8, lines 58 – 68. The Office Action further finds that Kasson teaches a gamut converter for optionally fitting (mapping) the gamut of the source color space (out-gamut points) to said target color space (device-dependent gamut) using the calculated hue angles, citing FIG. 5, col 8, lines 32 – 37 and lines 58 – 68, and col. 9, lines 48 – 65. The Office Action then concludes that it would have been obvious to one of ordinary skill in the art at the time of the present invention to calculate and use hue angles for gamut mapping as taught by Kasson and apply it into the method of Childs because using hue angles helps luminance variations at low spatial frequencies to which humans are relatively insensitive.

As a preliminary matter, the Childs disclosure comments on how out-of-gamut (out-gamut) colors are handled in the color space conversion techniques disclosed therein, by stating that "[i]t is important, however, to also consider what happens to colours outside this gamut; the system should "fail gracefully" under such conditions,

and should not behave in an unacceptable manner." Childs, at page 23 in the first paragraph of the section labeled "9." Childs goes on to state that handling colors in "region 4" of FIG. 7 is "more complex" and region 4 is further subdivided into sub-regions, which are shown in FIG. 8:

> These sub-regions are shown enlarged in Figure 8. In sub-region 4a, ... the displayed colour shifts towards the R_d primary.
>
> Similarly in sub-region 4c, ...[t]he colour moves towards the B_d primary.
>
> In sub-region db, ... [t]he final displayed colour is still on the line joining G_{1d} and G_{2d}, therefore, but its exact position on that line is harder to determine. In general, as the original colour moves along any particular arc AB, the displayed colour will move along the corresponding line A'B'. As the arc of colours becomes more saturated (e.g. the arc CD), so the length of the corresponding line C'D' becomes longer. In general, therefore, saturation changes in the incoming colours can produce hue changes in the reproduced colour. Nevertheless, it can be seen from Figure 8 that these hue changes are relatively minor (similar in magnitude to the hue changes that might be produced by saturation effects in present-day coding systems). Thus the performance of the four-primary display is unlikely to produce unacceptable colour errors in any part of the visible spectrum.

Childs, at page 24. Childs seems to suggest, therefore, that an explicit gamut converter configured for fitting the gamut of the source color space to the gamut of the target color space using calculated hue angles is neither desirable nor needed in the color space conversion system disclosed therein, and so this languages <u>teaches away</u> from making the combination of Childs and Kasson asserted in the Office Action.

That observation notwithstanding, however, Applicant has amended the limitation of the multi-primary converter in claim 21 to recite a multi-primary converter configured for converting said source image data color points from the N-primary

source color space into image data values for the at least N+1 primary target color space using one of a plurality of conversion matrices; wherein the multi-primary converter is further configured to select said conversion matrix using the calculated hue angles. As noted earlier in the discussion of the combination of Childs and Ito, the Office Action finds, with respect to claims 10 and 20 that the Childs reference does not explicitly provide any teachings with respect to hue angle.

In the discussion above, Applicant points out that (1) in the case of the Childs disclosure, one need only to convert a source color point into its chromaticity coordinates in the CIE color space or to its CIE XYZ tristimulus values (which is implicitly accomplished by each conversion matrix) to determine which of the conversion matrices is used to perform the color conversion; (see Childs at pages 12 and 15 – 22, and the hardware implementation shown in FIG. 4); and (2) using hue or hue angle to determine in which of the three regions of the target color space formed by the four display primaries in FIG. 5 a source color resides would not produce a unique result. Thus, Applicant respectfully submits that a person of ordinary skill would not use hue because it would not uniquely produce the correct conversion matrix to use to convert the input color to the output color.

Since Kasson teaches calculating hue angles for the purpose of gamut fitting (mapping), Kasson also does not teach a multi-primary converter further configured to select said conversion matrix using the calculated hue angles.

In view of the amendment to claim 21, therefore, the Office Action fails to state a *prima facie* case of obviousness with respect to claim 21 because the Applicant respectfully submits that the asserted combination does not actually teach each of the elements of claim 21 as amended.

For the foregoing reasons, Applicant respectfully submits that amended claim 21 is patentable over the asserted combination of Childs and Kasson, and is also in condition for allowance. As to new claims 30 and 31, these depend from now allowable claim 21, and so are also in condition for allowance.

New claims 32 and 33

Claim 32 is directed to an image processing system for converting an input N-valued color image data value in a source color space to an N+1-valued color image data value in a target color space, said source color space being defined by N primary color points and said target color space being defined by at least N+1 primary color points in said target color space, wherein N is an integer. The image processing system comprises a display for displaying image data in said target color space defined by said at least N+1 primary color points; and processing circuitry configured for accepting said input N-valued color image data value, and configured for producing said N+1-valued color image data value in said target color space for rendering on said display. The processing circuitry is further configured for calculating a hue angle for said input N-valued color image data value, for selecting conversion data using said hue angle, and for using said selected conversion data to produce said N+1-valued color image data value in said target color space.

For the reasons stated above with respect to the Childs, Ito and Kasson references and the teachings regarding hue angle, Applicant respectfully submits that newly added independent claim 32 is patentable over each of the Childs, Ito and Kasson, alone or in combination, and that claim 32 and its dependent claim 33 are also in condition for allowance.

Conclusion

In view of the foregoing amendments and remarks, Applicant respectfully submits that all pending Claims are patentable over the cited art of record and are in condition for allowance. Therefore, Applicant requests the Examiner to reconsider and withdraw the outstanding rejections and pass this application to allowance.

If the Examiner believes a telephone conference would expedite the allowance of the claims, the Examiner is invited to contact Judith C. Bares at (408) 200-7386.

Respectfully submitted,

/Judith C. Bares/

Judith C. Bares Reg. No. 35,824

Dated: December 20, 2006